

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:	CONF. NO.:	4980
STEPHEN J. BENNISON ET. AL.	CASE NO.:	AD6926USPCT
SERIAL NO.: 10/525,704	GROUP ART UNIT:	1773
FILED: FEBRUARY 18, 2005	EXAMINER:	NAKARANI
FOR: POLYVINYL BUTYRAL INTERLAYERS HAVING SUPERIOR ACOUSTICAL PROPERTIES AND METHOD OF PREPARING SAME		

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**DECLARATION UNDER 37 CFR 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Dr. Stephen J. Bennison, Ph.D., declare and state:

I am a named co-inventor on the subject patent application.

In 1980 I was awarded a Bachelor of Science degree (with honors) in Ceramics from the University of Leeds (Leeds, UK). My senior thesis was entitled "Microstructure-Mechanical Property Relations in a Machineable Glass Ceramic."

In 1983 I was awarded a Master of Science degree in Metallurgy and Materials Engineering from Lehigh University (Bethlehem, PA). My thesis was entitled "Grain Growth and Cavity Formation in  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>."

In 1987 I was awarded a Ph.D. in Materials Science and Engineering from Lehigh University. My dissertation was entitled "Effect of MgO Solute on the Sintering of High-Purity  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>."

I am an employee of E. I. du Pont de Nemours and Company (DuPont), the assignee of the subject patent application. Since 2007 I have been a Senior Research Associate for DuPont Packaging & Industrial Polymer Products in Wilmington, DE, where I have worked as a team leader for design with laminated glass. From 2000–2007, I was a Research Associate, DuPont Packaging & Industrial Polymer Products, in Wilmington, DE, and my responsibilities included: (a) development of glass/polymer laminates for architectural & automotive applications, with an emphasis on structural performance for building hardening, structural design, acoustic functionality and transport properties, and (b) implementation and management of modeling competency for materials design and performance specifications of laminated glass. From 1995–2000, I was a Senior Research Scientist, for the Central Research and Development department, where my duties included: (a) development of new polymer interlayers for laminated safety glazing and knowledge base for e-commerce

offering, and (b) fundamental research activities in the area of photonics and composites for dental applications. From 1992-1995, I was a Research Scientist, for the Central Research and Development department, and my responsibilities included fundamental and applied research programs addressing mechanical behavior and corrosion of materials.

DuPont is in the business of manufacturing and selling poly(vinyl butyral) (PVB) interlayers for laminated safety glass, and conducts research and development in this field. (DuPont's website states that laminated safety glass was born from research conducted in the 1930s by a consortium of companies, including DuPont, asked to find a clear, tough, adhesive material that could be manufactured efficiently into automobile windshields. (See, <http://www.dupont.com/safetyglass/en/science/history/index.html>)

Since 2003 I have been a Guest Professor for the China Building Materials Academy (CBMA) (Beijing, China).

From 1987-1991 I was a Guest Scientist, at the National Institute of Standards and Technology (NIST) (Gaithersburg, MD).

From 1980-1986 I was a Research Assistant and Teaching Assistant at Lehigh University.

I am an author or co-author of publications listed in the attachment to this Declaration.

I am named as an inventor or co-inventor on the following patents and applications:

- US 5,411,583, entitled "HF-resistant ceramics and use thereof"
- US 5,838,446, entitled "Determination of coating adhesion"
- US 7,294,397, entitled "Fibrillar microstructure for conformal contact and adhesion"
- US 2005-0042422 A1, entitled "Point attachment systems for laminated glass"
- US 2005-0266187 A1 entitled "Blast resistant glass laminates having improved" structural integrity against severe impacts"
- US 2006-0182983 A1, entitled "Thermoplastic resin compositions suitable for use in transparent laminates"
- US 2007-0289693 A1, entitled "Thermoplastic resin compositions suitable for use in transparent laminates"
- US 2007-0092706 A1, entitled "Mixed ion ionomeric sheets and high strength laminates produced therefrom"
- US 2006-0005482 A1 Point attachment systems for laminated glass and a process for preparing same"

I am involved in the following professional activities:

- Director of The American Ceramic Society (2000-2002).
- Chair Gordon Conference 2001, Solid State Studies in Ceramics.
- Vice-Chair Gordon Conference 2000, Solid State Studies in Ceramics.
- Co-organizer of focus session: *Mechanical Behavior of Layered Microstructures*, 1998 Annual Meeting of The American Ceramic Society.
- Discussion Leader, 1997 Gordon Research Conference: *Solid State Studies in Ceramics*.
- Program co-Chair of The Basic Science Division 1995 Annual Meeting of The American Ceramic Society.

- Program co-Chair of The Basic Science Division 1994 Fall Meeting - *Ceramics Manufacturing for the 21st. Century*. (American Ceramic Society).
- Co-organizer of symposium - *Fracture, Deformation and Mechanical Reliability of Ceramics*, 1993 Annual Meeting of The American Ceramic Society.
- Academic collaborations with: University of Chicago (Prof. Levi-Setti); Stanford University (Prof. Dauskardt); Imperial College London (Profs. Williams & Kinloch); Carnegie Mellon University (Prof. Saigal); University of Parma, Italy (Prof. Royer).

The claims of the subject application are focused on polyvinyl butyral (PVB) interlayers having sound-damping properties, glass laminates containing the interlayers and article containing the glass laminates. The independent claims focus on the PVB having a hydroxyl number in the range of from about 17 to about 19.5. They state that the interlayer is made with a single plasticizer in an amount in the range of from about 40 to about 50 parts per hundred (pph), wherein the plasticizer is tetraethylene glycol di heptanoate (4G7).

For instance, amended claim 1 reads:

1. An interlayer having sound-damping properties that is useful for preparing acoustic laminates, the interlayer comprising (i) polyvinyl butyral having a hydroxyl number in the range of from about 17 to about 19.5 and (ii) a single plasticizer in an amount in the range of from about 40 to about 50 parts per hundred (pph), wherein the plasticizer is tetraethylene glycol di heptanoate.

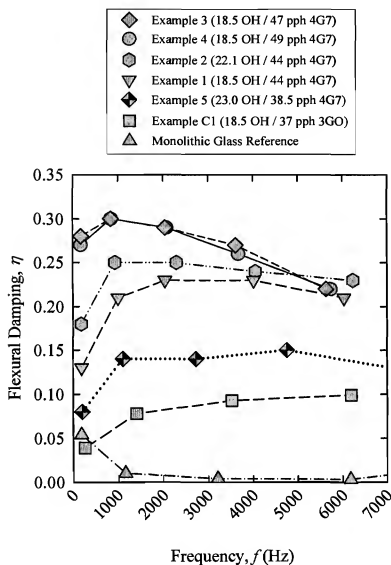
As another example, claim 15 recites:

15. An article comprising a glass laminate having sound-damping properties wherein the laminate comprises a single homogeneous interlayer of polyvinyl butyral positioned between two sheets of glass, wherein the polyvinyl butyral has a hydroxyl number in the range of from about 17 to about 19.5 and comprises a single plasticizer in an amount of from about 40 to about 50 pph parts, wherein the plasticizer is tetraethylene glycol di heptanoate.

I am aware that the claims of the subject patent application have been rejected over U.S. Patent No. 4,230,771 Phillips, which was also assigned to DuPont.

This Declaration adds data to the comparison already presented in the specification. Example 5 is newly added and shows use of a PVB interlayer representative of Phillips Example 1. Specifically, the Example 5 of the Declaration is directed to use of an interlayer comprising PVB having 23.0 % residual hydroxyl and 38.5 pph 4G7. The data is presented below.

The data in the subject patent application and Example were carried out by me or under my direction.



The above data shows that the invention provides superior damping properties and, thus, improved acoustic performance in laminated glass windows. My opinion is that increasing the plasticizer content and reducing hydroxyl amount provides a synergistic effect. Based upon my experience in the art, the data presented in the table shows that the invention provides significant advantages over the PVB interlayers, laminates and articles of the

example presented in Phillips. It is my opinion that these advantages would not be expected based upon the teachings of Phillips.

All statements made herein of my own knowledge are true, all statements made herein based on information and belief are believed to be true, and further that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

/Dr. Stephen J Bennison/

Stephen J. Bennison

Dated: May 9, 2008

PUBLICATIONS

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